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The MB-3 Tester is an electric motor-driven cabin leakage tester designed to furnish pressurized air to the aircraft at controlled pressures and temperatures during ground pressurization of aircraft cockpits and pressurized compartments. This report provides measured data defining the bioacoustic environments produced by this unit operating at a normal rated/load conditon. Near-field data are reported for 37 locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived

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noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol. 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

PREFACE

This report was prepared by the Biodynamic Environment Branch, Air Force Aerospace Medical Research Laboratory, under Project/Task 723107, Measurement and Prediction of Noise Environments of Air Force Operations.

The author gratefully acknowledges Mr. John N. Cole for his assistance in preparing this report, Mr. Robert G. Powell for his assistance in acquiring the raw data, Mr. Henry T. Mohlman and Mr. Fred D. Lampley of the University of Dayton for their assistance in the mechanics of data processing, and Mrs. Norma J. Peachey who typed and prepared the graphics.

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INTRODUCTION

The MB-3 tester is an electric motor-driven cabin leakage tester designed to furnish pressurized air to the aircraft at controlled pressures and temperatures during ground pressurization of aircraft cockpits and pressurized compartments.

This volume provides measured data defining the bioacoustic environments produced by this unit. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the MB-3.

This volume is one of a series published by the Air Force Aerospace Medical Research Laboratory (AFAMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during ground operations of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Refer to Volume 1 (reference 1) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published, and is available upon request from AFAMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of the updated index as it is generated.

Direct any questions concerning the technical data in this report and other handbook volumes to: AFAMRL/BBE, Wright-Patterson AFB, OH 45433; Autovon 78-53675 or 78-53664; Commercial (513) 255-3675 or (513) 255-3664.

1. Cole, John N., USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.

NEAR-FIELD NOISE

MEASUREMENTS

A standard MB-3 tester was operated outside, in front of radar docks used for aircraft maintenance, on a concrete slab, at a normal rated condition (3 psi). Due to the proximity of the radar docks no far-field data were acquired.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. These locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of locations/conditions. It is used in this report to maintain format consistency.

RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the MB-3 unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1

MEASUREMENT LOCATION AND TEST CONDITION FOR OPERATOR NOISE MEASUREMENTS

MB-3 Tester, Pressurized Cabin Leakage, Aircraft Tyndall AFB, 19 June 1980 FSN 4920-288-1566, Field # J-112

Measurement Location

1

Operator Control Panel

Operation

Α

(3 **PSI**)

1

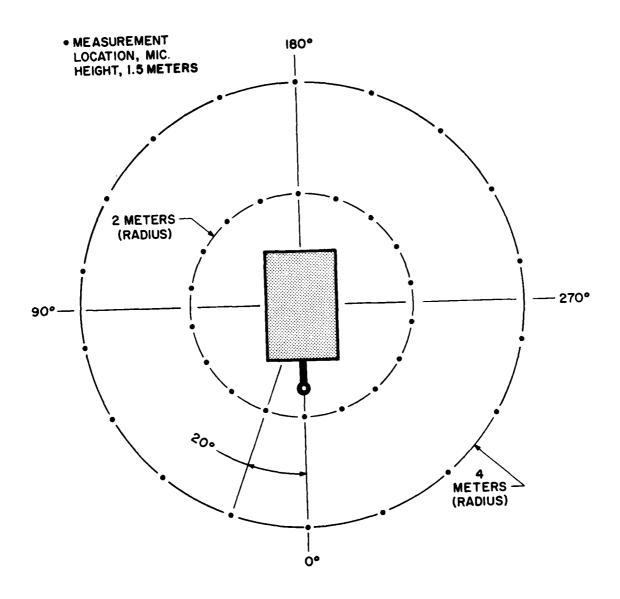


Figure 1. Measurement Locations

	EASURED SOUND PRE /3 OCTAVE BAND) OME	TIFICA GA 3. T BA-0	2
	CE/SUBJECT:	(0	FERATIO)) RUN	01	
	TER, PRESSURIZED	(LOADE	D (3 P	SI)))		
	AKAGE, AIRCRAFT LO N)ISE LEVELS	(?) 25	JAN 82	
NEAR FICE	EN MITSE FEAFER	Ċ					í) PAG	E F1	
					 L	OCATIO	N/COND	ITION						
	DISTANCE (M) ->	4	4	4	4	4	4	4	4	4	4	4	4	4
FREG	ANGLE (DEG)>	0	50	4 G	60	63	100	120	1 4 0	160	180	200	220	24
(HZ)	CONDITION>	A	A	A	A	A	A	A	A	A	A	A	A	A
25														
31.5														
40														
50			75<	75<	76<	75<	75<	75<	75 <					7
63 80		83 <	80<	82<	86	87	87	86	84	51<	60<	81<	80<	,
100			71<	71<										
125		77 <	76<	75 <	74<	71<	75<	78<	79<	79<	784	744	73<	
160		69 <	69<	694	70<	/1<	69<	704	68<	59<	71<	714	68<	
200		77	76	744	73<	78	78	80	79	78	81	83	81	7
250		89	86	82	79	89	90	92	96	59	92	94	91	7
315		73	72<	714	68 <	69<	71<	70<	724	71<	724	73	724	7
400		7.0	70	71	70	71	71	70	70	71	71	72	70	7
500		69	72	72	72	71	77	71	76	72	74	73	76	7
630		71	74	73	75	73	73	70	73	74	72	72	73	7
800		71	74	72	73	74	72	73	73	73	74	72	72	7
1000		73	72	73	74	71	77	76	77	75	74	74	76	7
1 25 0		72	71	70	73	72	72	73	73	73	74	73	74	7
1600		73	72	71	73	71	71	72	73	73	73	72	73	7
2000		72	71	73	74	71	71	72	72	71	70	73	73	7
2500		73	73	75	75	73	73	75	77	78	78	79	77	7
3150		73	72	74	73	72	15	74	74	73	73	74	76	7
4000		70	70	71	71	70	70	72	72	72	73	73	73	7
5000		71	71	72	72	72	72	73	75	75	73	75	74	7
6300		68	68	69	69	69	69	70	70	71	69	71	74	7
8000		67	68	69	70	69	69	70	70	71	69	70	70	7
10000		63	64	65	66	67	65	66	67	57	66	66	68	6
OVERALL		90	89	8.8	59	92	93	94	93	91	93	95	92	8

	EASUKED SOUND PRI /3 OCTAVE BAND) OHE	TIFICA Ga 3.	2
	CE/SUBJECT: TER, PRESSURIZED	(0	FERATI LOADE		S1)	*****))					-) TES) RUN	02 02	00-00
	AKAGE, AIRCRAFT	()) 25	JAN 82	'
NEAR FIE	LO NOISE LEVELS	())) PAG	E F2	
						OCATION	ZCONO1	 ! ! ! nn						
	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	2	2
FRED (HZ)	ANGLE (DEG)> CONDITION>	260 A	280 A	300 A	320 A	343 A	0 8	20 A	4 D A	50 A	8 0 A	100 A	120 A	140
25														
31.5														
40														
50		•••	TO .			45	78<	78<	77 < 86	77< 37	78<	76<	79<	79 87
6 3 80		73 <	79<	84	86	85	014	83<	00	3 r	6.3	30	• •	87
100			72<	73<	73<	74<	72<	73<	73<	72<	71<		72<	75
125			,	, , ,	13<	72<	76<	77<	79<	78<	784	79<	81<	83
160		63 <	70<	63<	69 <	69 <	73<	734	724	724	724	704	70<	72
200		32	82	76	72 <	79	81	79	76	78	77	76	76	78
250		3 3	94	87	81	90	92	88	85	88	66	a 6	86	86
315		72 <	73	70<	69<	79<	15	7 b	73	73	74	74	75	77
400		70	71	71	72 75	70	73 79	73 75	74 79	76 85	77 86	7.6	74 79	75 78
500 630		73 70	72 74	72 73	73	71 71	76	75 76	76	30 30	76	65 78	76	78
800		75	73	75	75	74	77	77	76	78	73	76	74	76
1000		76	76	75	79	76	77	61	79	78	7.5	76	78	79
1250		75	74	74	74	72	76	75	78	77	73	77	77	78
1600		74	73	15	72	71	77	75	77	78	77	76	77	79
2000		75	76	75	74	71	76	76	77	76	7 0	76	76	77
2500		77	77	7 5	77	7.4	76	7£	79	77	77	77	78	81
3150		75	77	77	76	75	74	74	79	77	77	77	77	79
4900		74 75	75 77	75 77	74 75	71 73	72 73	72 74	76 76	75 77	75 77	74 76	75 77	77 78
5000 6300		75 73	74	73	72	73 70	73	71	73	74	74	75	73	74
8000		72	73	73	71	70	70	71	74	75	74	73	73	74
10300		65	63	6.5	68	60	06	67	70	70	71	70	70	72
										. •				
OVERALL		34	95	91	9.0	92	94	92	92	34	94	93	93	93

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

13JEAT	MEASURED SOUND PRE	ESSURE	LEVEL	(80)								DICENTIFICATIONS
2	1/3 OCTAVE BAND)
	RCE/SJBJECT: STER, PRESSURIZED		FERATI	ONI)) PUN 03
CABIN L	EAKAGE, AIRCRAFT	ì	2040	• • •	<i>31.</i>)) 25 JAN A2
		<u>(</u>					;) PAGE F3
							N/CONE	-				
FREQ	DISTANCE (M) -> ANGLE (DEG)>		2 180	2 200	2 220	2 243	2 26 0	2 2 A D	2 300	? 320		PERATOR LOCATION TEST CONDITION
(HZ)	CONDITION>		A	A	A	A .	A	A	A .	A	Δ.	1/4
25												
31.5												81<
40												
50 63		75 < 35	79<	78<	77<	76 <	75<	76 <	76 <	77<	78<	83<
8 D		37	84<	95<	95 <	82 <	81<	79 <	79 <	79<	794	73<
190		71 <	72<						72<	73<	72<	78<
125		50 <	79<	76<	73<				73<	774	774	76<
160		71 <	72<	71<	69 <	63<	724	72<	72<	71<	71<	79
200		34	69	89	85	83	b 6	à6	85	79	73	93
250		95	100	101	97	96	97	97	97	87	8 4	103
315		76	79	79	Ź8	77	77	76	77	75	724	86
400		75	77	77	77	77	77	76	75	75	74	83
500		80	78	78	81	79	81	79	81	90	78	86
630		76	76	77	75	77	77	77	81	32	79	84
800		77	77	79	78	73	77	77	78	9.0	75	84
1000		77	78	91	51	8.0	78	79	9.0	31	76	86
1250		7£	78	78	79	79	8.0	8.0	80	79	7.7	87
1600		78	77	75	78	89	6 0	51	9.0	78	76	86
2000		77	75	78	79	78	8 1	8 D	80	78	77	88
2500		31	61	81	82	81	b 1	82	95	31	77	90
3150		75	77	79	79	82	8 1	82	81	8.0	76	89
4000		76	76	77	77	78	78	79	79	77	73	86
5000		77	7.7	73	79	79	80	81	81	79	76	90
6300		73	74	74	75	77	7.8	78	7.8	76	73	86
8 0 0 0		76	75	75	76	7/	77	78	78	77	7+	86
10000		72	71	72	73	73	73	74	74	73	70	83
CVERALL		96	101	101	36	96	90	98	98	93	92	105

LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

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ARLES	MEASURED SOUND PRE	SUR!	ELEVEL	(86)								LIDE	HTIFIC	ATIONE
2	OCTAVE SAND												GA 3	
OISE SOL	FRUE/SUBJECT:		DFERATI	DN:			٠١) TE:	5T RA- V 01	000-00
	STER, PRESSURIZED			0 (3 4	1129		'n					1		
	EAKAGE. AIRCRAFT	i		• • •			,) 25	JAN 8	2
	ELO NOISE LEVELS	i					ý					; ``	4 0	
		ė					ì) PA	36 J1	
						OCATIO	N/CONS	ITION						
	DISTANCE (M) ->	4	4	4	4	4	4	4	4	•	4	4	4	4
FREG	ANGLE (DEG)>	a	20	40	60	63	100	120	1+0	150	100	280	220	240
(HZ)	CONDITION>	A	A	Α	A	Δ	A	A	A	4	A	Α	A	Δ
31.5	;													
6.3			8 1	83	86	87	67	0.0	95					
125		77	7.9	77	76	74	75		79	79	73	7 E	74	
250		86	86	63	40	8.3	90	32	90	39	9 2	95	91	7 0
500		75	77	77	77	75	79	75	78	77	77	77	76	79
1000		77	77	77	78	77	79	79	60	79	78	78	79	79
2000		77	77	7.6	79	76	77	76	79	3.0	7.4	51	80	81
4030		75	76	77	77	76	76	78	78	7.8	78	79	79	8.0
8030		71	7.2	73	73	73	73	74	74	74	73	74	74	75
OVERALL		43	89	da	89	92	93	93	93	∌1	93	35	92	87

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	FASURED SOUND PRI GTAVE BAND	FS SU	RE LEVEL	(80)) OHI	NTIFICA Ega 3.	2
OISE SOUR	GE/SUBJECT:	1	OFERATI	ONI)) RU	ST BA-(N 02	ט ני – ט עו
	TER, PRESSURIZED	(LOADE	0 (3 (PSI)))		
	AKAGE, AIRCRAFT	()) 25	JAN 82	?
NEAR FIE	LD NOISE LEVELS	())		
		(1				_) PAI	2E 75	
						LUCATIO	N/COND	ITION						
	DISTANCE (M) ->	4	4	4	4	4	2	2	2	2	2	2	5	2
FRFO	ANGLE (DEG)>	260	280	300	320	340	Đ	20	40	60	8 0	100	120	140
(HZ)	CONDITION>	A	A	A	A	A	Δ	A	A	A	A	A	A	A
31.5								_	_					
6.3							£ 3	85	86	37	6.9	59	6.6	9.8
125			74	74	77	77	79	79	80	50	73	79	82	83
250		93	94	ôo	81	90	95	89	86	59	67	87	86	87
500		76	7/	77	78	75	ö 2	8.0	82	36	87	86	82	82
1000		٥٥	79	79	81	79	51	53	83	92	8 3	8 1	81	8.2
5000		80	6.0	61	79	77	01	8 0	83	32	81	61	82	84
4050		80	81	81	8.0	78	78	78	82	81	81	81	81	83
8000		75	77	77	75	74	74	75	77	76	76	77	77	78
						•	•				٠.			
OVERALL		34	95	90	85	91	94	92	92	34	94	3 3	93	93

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	MEASURED SOUND PRI OCTAVE HAND	E S SU	RE LEVE	L (B8)) IDENTIFICATION:
	RGE/SUBJECT I		OFERAT:	IONE			}) OMEGA 3.2) TEST 9A-000-00) RUN 03
	TER, PRESSURIZED	{	LOADS	ED (3)	PSII)					•
	AKAGE, AIFCPAFT	()) 25 JAN 82
NEAR FIE	LO NOISE LEVELS	())
		()) PAGE J3
						LOCATIO	ON/CON	TITION				
	DISTANCE (M) ->	2	2	2	2	2	2	5	2	2	2	OPERATOR LOCATION
FRED	ANGLE (DEG)>	160	180	200	220	243	260	288	300	320	340	TEST CONDITION
(HZ)	CONSITION>	4	Δ	A	A	A	Δ	Д	A	Д	۵	1/4
31.5												
63		85	85	84	83	63	82	51	81	90	81	90
125		81	81	78	75				77	79	73	8 2
25 0		95	101	131	97	94	97	98	97	9.8	90	104
300		82	82	82	83	83	8 ↔	02	84	35	82	89
1330		81	83	84	84	84	83	84	84	15	8.1	90
2300		83	63	5 4	84	85	85	8€	85	34	61	93
₩ 3 D C		61	01	33	3.3	8.7	84	35	35	3.3	8.)	93
8700		79	78	7.5	30	61	51	82	9.5	30	77	90
OVERALL		95	101	101	38	96	96	99	96	33	92	105

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TABLE: MEASURES OF	HUMAN NOIS	F EXPOS	URE								PICE	NTIFIC	ATIONE
3											j (4)	FGA 3 St BA-	
NOISE SOURCE/SUBJECT MB-3 TESTER, PRESS		ITARE PO	100 1 (7 P	SI))) RUI		
CABIN LEAKAGE, AIP NEAR FIFLD NOISE L)) 25	JAN 8	?
	(,) PA	GF 41	
					LOCATIO	N/CUN	DITION						
DISTANCE Angle (D		4 21	47	4	4 80	100	4 120	4	4	183	4 20a	229	240
CONDITIO		A	Ā	A	A	4	120	140 A	160 4	¥ 2	4	A A	A A
HAZARD/PROTECTION													
C-WEIGHTED OVERA	LL SOUND LF	VEL COA	SLC IN	DBC) AT EAS	2							
A-WEIGHTED OVERA													
MAXIMUM PERMISSI	BLE TIME (T	IN MIN	UTES)	FOR	ONE EXPO	SURE	PER DAY	(AFR	161-3	5, JU_Y	73)		
NO PROTECTION					_				_				
OASLC	90	89	88	89	91	٥٥	93	92	€1	93	95	92	97
OASL 4	85	84	84	84	35	86	87	87	36	87	19	67	46
Ť	4 94	483	460	480	4 04	339	285	205	339	285	202	285	4 5 9
HINIPUM APL EAR HU			_							_			
OASLA*	55	65	b 3	63	67	6.8	69	68	67	7 u	71	68	61
T	960	961	96)	960	950	960	360	960	950	960	960	960	960
AMERICAN OPTICAL I		-											
OASLA* T	52	61	60	61	64	65	66	64	63	65	67	64	56
V-516 FAR PLUGS	960	960	960	900	960	960	960	960	960	96 0	960	960	96 0
							. .						
	61	53	54	58	62 960	63 960	64	63	32	65	66	64	59
OASLA*		~					960	360	350	96 0	960	960	960
Ť	950	960	961	960		,,,,							
T AMERICAN OPTICAL 1	950 700 EAR MUFF	FS PLUS	V-51R	EAR	PLUGS								
T AMERICAN OPTICAL 1 Gasla*	950 700 EAR MUFF	FS PLUS	V-51R	64×	FLUGS 47	+6	49	49	48	49	÷0	48	45
T AMERICAN OPTICAL 1 GASLA+ T	950 700 EAR MUFF 40 960	FS PLUS 45 960	V-51R	EAR	PLUGS			49 960	48 960	49 96 D	>0 960	48 960	45 960
T AMERIGAN OPTICAL 1: OASLA+ T H-133 GROUND COMMU	950 700 EAR MUFF 40 960 Nicaticn Uni	FS PLUS 45 960 IT	V-51R 45 960	EAR 46 960	FLUGS 47 960	÷6 960	49 960	950	960	960	960	960	960
T AMERICAN OPTICAL 1 GASLA+ T	950 700 EAR MUFF 40 960	FS PLUS 45 960	V-51R	64×	FLUGS 47	+6	49						-
T AMERICAN OPTICAL 1: OASLA* T H-133 GROUND COMMU	950 700 EAR MUFF 40 960 Nication Uni 58	FS PLUS 45 960 IT 57	V-51R 45 960 59	EAR 46 960	FLUGS 47 960 59	¥8 960 €0	49 960 61	960 61	960 60	96 D	960 63	960 61	960 59
T T T T T T T T T T T T T T T T T T T	950 700 EAR MUFF 950 Nication Un) 33 960	FS PLUS 45 960 IT 57 960	V-51R 45 960 59 960	56 960	FLUGS 47 960 59 960	¥8 960 €0	49 960 61	960 61	960 60	96 D	960 63	960 61	960 59
T AMERICAN OPTICAL 1: GASLA* T H-133 GROUND COMMUI OASLA*	950 700 EAR MUFF 950 Nication Un) 33 960	FS PLUS 45 960 IT 57 960	V-51R 45 960 59 960	56 960	FLUGS 47 960 59 960	¥8 960 €0	49 960 61	960 61	960 60	96 D	960 63	960 61	960 59
T T T T T T T T T T T T T T T T T T T	950 700 EAR MUFF 960 NICATION UNI 93 960 INTERFERENC	FS PLUS 45 960 IT 57 960 CF LEVE	V-51R 45 960 59 960	EAR 46 960 56 960	FLUGS 47 960 59 960	+8 960 ₹0 960	43 960 61 960	950 61 960	960 60 960	960 61 960	960 63 900	960 61 960	960 59 960
T T T T T T T T T T T T T T T T T T T	950 700 EAR MUFF 40 950 NICATION UN: 960 INTERFERENC 76	FS PLUS 960 IT 57 960 CF LEVE 77	9-51R 9-60 5-9 9-60 9-60 1 (PSI) 77	EAK 46 960 56 960 L IN 78	PLUGS 47 963 59 960 08) 77	¥8 960 €0 960	43 960 61 960	950 61 960	960 60 960	960 61 960	960 63 900	960 61 960	960 59 960
T T T T T T T T T T T T T T T T T T T	950 700 EAR MUFF 40 950 NICATION UN: 960 INTERFERENC 76	FS PLUS 960 IT 57 960 CF LEVE 77	9-51R 9-60 5-9 9-60 9-60 1 (PSI) 77	EAK 46 960 56 960 L IN 78	PLUGS 47 963 59 960 08) 77	¥8 960 €0 960	43 960 61 960	950 61 960	960 60 960	960 61 960	960 63 900	960 61 960	960 59 960

^{*} BASED ON GALGULATED SPL SPECTPUM UNDER PROTECTIVE JEVICE.

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TABLE: MEASURES OF HE	ZIEN NAM	E EXPOS	URE								FIGE	NTIFIC	ATIONS
3			····-									EGA 3. St BA-1	
NOISE SOURCE/SUBJECT: MB-3 TESTER, PRESSURI		OFFRATI FCAG	0N1 D (3 P	SI))) Rui	N 02	
CABIN LEAKAGE, AIPCRE)) 25	JAN 8	2
	(, ,) PA(GE H2	
					LOCATI				_	_	_	_	_
DISTANCE (4	4	4	. 4	2	2	2	2	2	2	2	2
ANGLE (DEG) Condition-		280 A	330 A	320 A	340 A	i A	2 U A	40 A	50 A	e j A	130 A	120 A	140 A
4AZARD/PPOTECTION													
C-WEIGHTED OVERALL	SOUND LF	AC) JAV	SLC IN	080	AT EAR	?							
A-WEIGHTEG OVERALL													
MAXIMUM PERMISSIBLE	TIME (T	IN MIN	UTESI	FOR C	ONE EXP	SUPE	PER DAY	(AFR	161-39	JU_Y	73)		
NU PROTECTION													
OASLC	94	95	91	90	92	94	92	92	93	93	93	92	93
OASLA	95	89	37	80	gr.	٥â	85	89	3.0	83	89	6.6	90
Ť	2+0	202	285	339	339	240	240	202	178	202	202	240	170
MINIMUM APL EAR MUFFS													
OASLA.	70	71	65	64	63	70	67	67	69	69	00	68	58
†	960	960	960	950	303	960	960	96 D	900	96 O	960	960	960
AMERICAN OPTICAL 170													
	65	67	62	61	64	66	6.5	63	65	65	65	64	65
OASLA*						960	960	960	950	96 D	960	960	960
Ť	960	950	960	960	960	760	300	,00					
T V-51R EAR PLUGS		• • •			• • •								
T V-51R EAR PLUGS OASLA*	55	65	62	60	63	65	64	63	35	65	64	63	64
T V-51R EAR PLUGS OASLA* T	55 960	65 960	62 950	60 960	63 960				950	65 960	64 960	63 960	64 960
T V-51R EAR PLUGS OASLA+ T AMERICAN OPTICAL 1701	55 960 D EAR MUF	65 960 FS PLUS	62 950 V-51R	60 960 EAR	63 960 PLUGS	65 960	64 960	63 960	950	960	960	960	960
T V-51R EAR PLUGS OASLA+ T AMERICAN OPTICAL 1701 OASLA+	55 960 0 EAR MUF 50	65 960 FS PLUS	62 950 V-51R 48	60 960 EAR 48	63 960 PLUGS 43	65 960 50	64 960 49	63 960 49	950 51	960 51	960 50	960	960 50
T T FAR PLUGS OASLA* AMERICAN OPTICAL 1701 OASLA*	55 960 0 EAR MUF 50 960	65 360 FS PLUS 50 360	62 950 V-51R	60 960 EAR	63 960 PLUGS	65 960	64 960	63 960	950	960	960	960	960
T V-51R EAR PLUGS OASLA* T AHERICAN OPTICAL 1700 OASLA* T T H-133 GPOUND COMMUNIC	55 960 0 EAR MUF 50 960 CATION UN	65 960 FS PLUS 50 960	62 950 V=51R 48 960	60 960 EAR 48 960	63 960 PLUGS 43 960	65 760 50 960	64 960 49 960	63 960 49 960	960 51 960	96 0 5 1 96 0	960 50 960	960 49 960	960 50 960
T V-51R EAR PLUGS OASLA* T AMERICAN OPTICAL 1701 OASLA* T H-133 GPOUND COMMUNI(OASLA*	55 960 9 EAR MUF 50 960 CATION UN 62	65 960 FS PLUS 50 960 IT	62 950 V-51R 48 960	60 960 EAR 48 960	63 960 PLUGS 43 960	65 960 960	64 960 49 960	63 960 49 960	950 51 960 52	960 51 960 62	960 960 62	960 49 960	960 50 960
T FAR PLUGS OASLA* AHERICAN OPTICAL 1700 OASLA* T H-133 GPOUND COMMUNIC	55 960 0 EAR MUF 50 960 CATION UN	65 960 FS PLUS 50 960	62 950 V=51R 48 960	60 960 EAR 48 960	63 960 PLUGS 43 960	65 760 50 960	64 960 49 960	63 960 49 960	960 51 960	96 0 5 1 96 0	960 50 960	960 49 960	960 50 960
V-51R EAR PLUGS OASLA* T H-133 GROUND COMMUNIC OASLA* T T T T T T T T T T T T T T T T T T T	55 960 9 EAR MUF 50 960 CATION UN 62	65 960 FS PLUS 50 960 IT	62 950 V-51R 48 960	60 960 EAR 48 960	63 960 PLUGS 43 960	65 960 960	64 960 49 960	63 960 49 960	950 51 960 52	960 51 960 62	960 960 62	960 49 960	960 50 960
V-51R EAR PLUGS OASLA* T H-133 GROUND COMMUNICOASLA* T	55 960 D EAR MUF 50 960 CATION UN 62 960	65 950 FS PLUS 50 960 IT 62 960	62 953 V-51R 48 963 61	60 960 EAR 48 960 60	63 960 PLUGS 43 960 60	65 960 960	64 960 49 960	63 960 49 960	950 51 960 52	960 51 960 62	960 960 62	960 49 960	960 50 960
T T EAR PLUGS OASLA* T OASLA* H-133 GPOUND COMMUNICOASLA* T COMMUNICATION	55 960 D EAR MUF 50 960 CATION UN 62 960	65 950 FS PLUS 50 960 IT 62 960	62 953 V-51R 48 963 61	60 960 EAR 48 960 60	63 960 PLUGS 43 960 60	65 960 960	64 960 49 960	63 960 49 960	950 51 960 52	960 51 960 62	960 960 62	960 49 960	960 50 960
T V-51R EAR PLUGS OASLA* T AHERICAN OPTICAL 1700 OASLA* T H-133 GPOUND COMMUNIC OASLA* T COMMUNICATION PREFERRED SPEECH IN	55 960 0 EAR MUF 50 960 CATION UN 62 960	65 350 FS PLUS 50 360 IT 62 960 CE LEVE	62 950 V-91R 48 960 61 960	60 960 EAR 48 960 60 960	63 960 PLUGS 43 960 60 960	65 960 960 960	64 960 49 960 61 960	63 960 49 960 63 960	950 51 960 52 950	960 51 960 62 960	960 50 960 62 960	960 49 960 62 960	960 960 960 980
TOWNUNCE PERCEIVED NOISE LET	55 960 0 EAR MUF 50 960 CATION UN 62 960 NTERFEREN 79	66 360 FS PLUS 50 360 IT 62 960 CE LEVE	62 950 V-51R +8 960 61 960 L (PSI	60 960 EAR 48 960 60 960	63 960 PLUGS 43 960 60 900	65 960 960 62 960	64 960 49 960 61 960	63 960 49 960 63 960	950 51 960 52 950	960 51 960 62 960	960 50 960 62 960	960 49 960 62 960	960 50 960 63 960
T T FAR PLUGS OASLA* AMERICAN OPTICAL 1701 OASLA* H-133 GPOUND COMMUNI(OASLA* T COMMUNICATION PREFERRED SPEECH IN PSIL	55 960 0 EAR MUF 50 960 CATION UN 62 960 NTERFEREN 79	66 360 FS PLUS 50 360 IT 62 960 CE LEVE	62 950 V-51R +8 960 61 960 L (PSI	60 960 EAR 48 960 60 960	63 960 PLUGS 43 960 60 900	65 960 960 62 960	64 960 49 960 61 960	63 960 49 960 63 960	950 51 960 52 950	960 51 960 62 960	960 50 960 62 960	960 49 960 62 960	960 960 960 960

^{*} BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

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	ABLE: MEASURES OF HI	IZION NAML	E EXPOS	.U⇒£)IDENTIFICATION
CABIN LFAKAGE, AIRCPAFT (3				 .)) OMEGA 3.2 :) TEST BA-000-01
CABIN LEAKAGE, ATRCPAFT ()) 25 JAN NEAR FIELD NOISE LEVELS ())) PAGE CHART FIELD NOISE LEVELS ())) PAGE CONSTRUCE (4) -> 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2					1127)					
LUCATION/CONDITION PAGE	CABIN LEAKAGE, AIRCP	AFT (LUAD		34,		,					25 JAN 82
OFFICE Companies Compani	HEAR FIELD NOTSE LEV						,) PAGE H3
ANGLE (DEG)> 160 180 200 220 240 260 280 380 320 340 TEST COND CONDITION> A A A A A A A A A A A A A A A A A												
CONDITION> A A A A A A A A A A A A A A A A A												OPERATOR LOCATION
#AZARD/PRUTECTION C-MEIGHTED OVERALL SOUND LEVEL (DASLO IN UBC) AT EAR A-MEIGHTED OVERALL SOUND LEVEL (DASLA IN DBA) AT EAR MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) NO PROTECTION OASLO 36 101 101 98 96 97 96 96 93 92 100 OASLA 91 94 94 92 92 93 93 93 93 91 91 68 100 T 143 65 85 120 120 101 101 101 101 101 143 241 3 PINIMUM OPLEAR MUFFS UASLA* 72 77 77 74 72 74 74 74 54 64 84 84 84 84 84 84 84 84 84 84 84 84 84												TEST CONDITION
C-METGHTED OVERALL SOUND LEVEL (DASLG IN UBC) AT FAR A-METGHTED OVERALL SOUND LEVEL (DASLA IN DBA) AT EAR MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) NO PROTECTION OASLC 35 101 101 98 96 96 96 96 93 92 100 OASLA 91 94 94 92 92 93 93 93 31 16 101 T 143 65 85 120 120 101 101 101 101 101 143 243 3 MINIPUM OPL EAR MUFFS OASLA* 72 77 77 74 72 74 74 74 74 54 65 65 8 T 960 960 960 960 960 960 960 960 960 960	CONTITION~	> A	A	A	A	A	A	A	A	1	A	1/8
### A-METGHTED OVFRALL SOUND LEVEL (DASLA IN DBA) AT EAR MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PEL DAY (AFR 161-35, JULY 73) **NO PROTECTION** **OASLO****** **OASLA****** **OASLA***** **OASLA***** **OBO 960 960 960 960 960 960 960 960 960 960												
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73) NO PROTECTION OASLO OASLO OASLA 91 94 94 92 92 93 93 93 91 68 10 10 10 10 10 10 10 10 10 10 10 10 10												
NO PROTECTION OASLC 35 101 101 38 96 59 96 96 93 92 100 OASLA 91 94 94 92 92 93 93 93 91 68 100 T 143 65 85 120 120 101 101 101 101 143 243 3 MINIMUM 1PL EAR MUFFS UASLA* 72 77 77 74 72 74 74 74 58 63 8 AMFRICAN OPTICAL 1700 EAR MUFFS OASLA* 66 73 73 70 68 70 70 70 67 64 77 77 74 75 74 75 75 69 68 76 960 960 960 960 960 960 960 960 960 96												
04SLC		E TIME (T	IN MI	NUTES)	FOR C	ONE EXP	OSURE	PE' DAY	(AFR	161-3	5, JUL	Y 73)
OASLA 91 94 94 92 92 93 93 93 91 68 10 T 143 65 85 120 120 101 101 101 101 143 243 3 3 MINIPUM OPL EAR MUFFS UASLA* 72 77 77 74 72 74 74 74 56 63 8		35	101	101	98€	96	59	Q B	98	9.3	92	105
MINIMUM 10PL EAR MUFFS UASLA* 72 77 77 74 72 74 74 74 58 63 8 T 960 960 960 960 960 960 960 960 960 960				94	92	92	93	93	93	31	t đ	100
UASLA* 72 77 77 74 72 74 74 74 58 63 88 T 960 960 960 960 960 960 960 960 960 960	Ť	143	â5	85	120	120	101	101	191	1+3	243	30
AMFRICAN OPTICAL 1700 EAR MUFFS OASLA* 06 73 73 70 68 70 70 70 07 64 77 7 950 960 960 960 960 960 960 960 960 960 96	MINIPUM OPL EAR MUFF!	S										
AMERICAN OPTICAL 1700 EAR MUFFS OASLA*	UASLA#	72	77	77	74	72	74	7.4	74	5đ	63	81
OASLA* 06 73 73 70 68 70 70 70 61 64 7 7 7 7 7 7 7 7 7 7 96 96 960 960 960 960 960 960 960 960 9	T	960	960	360	960	960	7 to 0	960	960	960	960	807
TT	AMFRICAN OPTIJAL 170	DEAR MUF	FS									
V-51F FAR PLUGS OASLA* 07 72 73 69 68 70 70 69 55 64 70 T 900 960 960 960 960 960 960 960 960 960	OASLA .	•6	73	73	/0	68	76	73	70	ó T	£ #	77
DASLA*		⇒50	960	960	950	960	3 o 0	360	960	950	960	960
T 920 960 960 960 960 960 960 960 960 960 96												
AMERICAN OPTICAL 1700 EAF MIFFS PLUS V-DIR EAR PLUGS OASLA* 52 56 56 54 52 54 54 54 31 49 6 I 960 960 960 960 960 960 960 960 960 960	DASLA *	70	7?	7 ₹	69	68	70	71	69	55	64	75
OASLA* \$2 56 56 54 52 54 54 54 31 49 6 T 960 960 960 960 960 960 960 960 960 H-133 GROUND COMMUNICATION UNIT CASLA* 64 67 66 63 61 7 T 950 960 960 960 960 960 960 960 950 960 960 960 PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN CO) PSIL 82 63 83 34 94 84 84 84 34 81 9							960	968	96 B	960	960	960
T 960 960 960 960 360 360 960 960 960 960 960 960 960 960 960 9												
H-133 GFOUND COMMUNICATION UNIT CASLAP D4					-		_		-			61
CASLA* T 350 360 360 360 360 360 360 360				963	960	360	760	963	960	900	960	960
T 350 360 960 960 960 360 960 960 960 960 960 960 960 960 960 9												
COMMUNICATION PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB) PSIL B2 03 83 84 84 84 84 84 84 81 9 ANNOYANCE												73
PRÉFERRED SPEECH INTERFERENCE LEVEL (PSIL IN 08) PSIL 82 03 83 84 94 84 84 84 34 81 9 ANNOYANGE	ı	3 20	463	960	460	960	360	460	960	428	350	360
PRÉFETRED SPEECH INTERFERENCE LEVEL (PSIL IN 08) PSIL 82 of 83 84 94 84 84 84 34 81 9 ANNOYANCE	OMMUNICATION											
PSIL 42 03 83 94 94 84 84 84 94 81 9		NTERFEREN	CE LEVE	L (PS	IL IN	CB)						
ANNOYANCE							84	84	84	34	81	91
			-	•		•		•	•	• •		• •
######################################	NNOYANCE											
PERCEIVED HOISE LEVEL, TUNE CORRECTED (PMLT IN PMDB) TONE CUPPECTION (C IN GB)			CORREC	CTED (PNLI 1	ED PND3)					
			111	112	110	1.02	110	110	110	106	10+	117
ia		- •										2

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